Vol. 1 No. 4
April 1986

PRM
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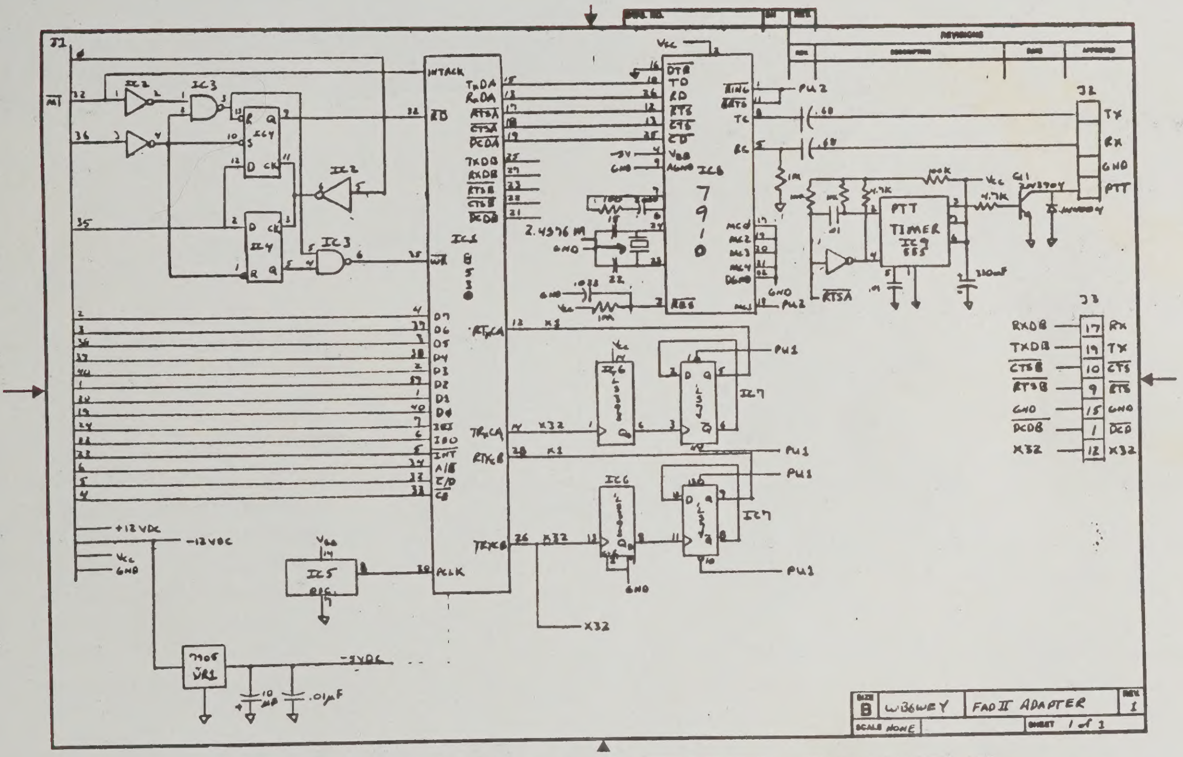
PACKET RADIO MAGAZINE

Dedicated to the Advancement of Packet Radio



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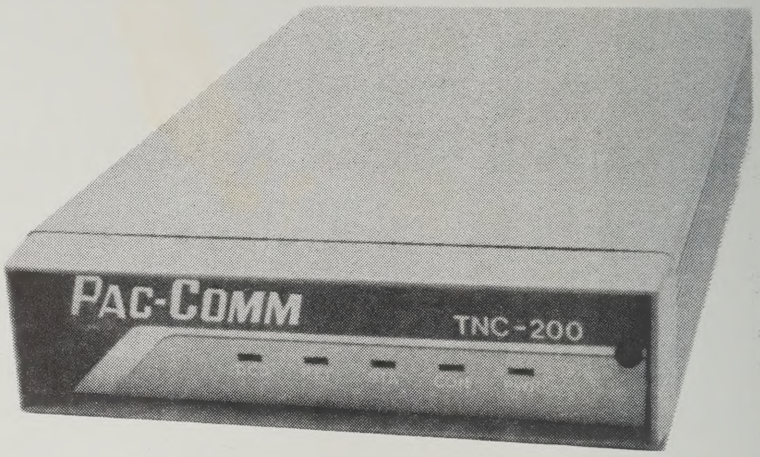

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PACKET RADIO MAGAZINE

PACKET RADIO MAGAZINE is published monthly by the Florida Amateur Digital Communications Association, Inc. (FADCA), 812 Childers Loop, Brandon, FL 33511. (813) 689-3355.
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Subscriptions to PACKET RADIO MAGAZINE are available through membership in FADCA or other participating clubs. Check the newsletter section for a club in your area, or contact FADCA for individual membership. FADCA membership dues (US Dollars): United States = $15.00, Canada = $18.00, Foreign (airmail) $25.00. (All but $3.00 of dues is for the subscription to PRM.) Major clubs desiring to participate in PRM should contact the FADCA office.

News and Views

Gwyn Reedy, W1BEL

FEEDBACK FROM READERS

The reaction to PACKET RADIO MAGAZINE has been completely favorable. I'd like to share with you some of the comments that have been made and discuss some ideas for the future.

There has not been one single negative comment received from a FADCA member about the conversion of the FADCA > BEACON into a news section of PRM. During the planning for PRM, that was my greatest concern, i.e. that the Florida members would feel their publication was being diluted for the benefit of others.

The ragged right margin of each column has drawn a few negative comments, but the lack of long spaces between words has made reading easier according to some. In any event, this issue PRM has gone to proportional spacing which gives the benefits of both a pleasing appearance and easier reading. This change was made possible because of the switch from the Xerox-820-1 to a PC-Clone for preparation of the text. Yes, Virginia, the FADCA > BEACON and PRM have been worked up on an 820 for almost two years. (Prior to that it was on an S-100/Z-80 system.) During all this time I have used the same brand of word processing software (Wordstar). For some reason, I could never get it to drive the printer in proportional spacing from the 820, but that's not a problem on the clone. It is also nice to have much more disk space to work with.

There have been a number of favorable comments about the imbedded club newsletters. There is a need for the local groups to know what is going on in other areas, and a number of readers feel PRM is filling that need.

The magazine type format has been universally liked. Naturally things are a bit amateurish (look who is doing the work, HI) but there should be gradual and steady improvement as we learn. I am experimenting with software designed for publishing use, and that should improve both appearances and reduce the time to produce the PRM.

Groups continue to sign up for the 'club membership' plan, although not all send in information for publication. To date eight groups have signed up, with the recent ones being CAPRA (Chicago), KCAPRG (Kansas City), MAPRAC (MD/DEL/VA area), and several more are in the process of joining.

We are pursuing a second class mailing permit. The record keeping requirements to qualify are somewhat different than what FADCA has been doing. FADCA members and participating club representatives will soon receive a mailing which will require your certification that you understand that a portion of your club dues are for subscription to PRM. That certification must be returned. We must have such statements on file for 51% of our subscribers. Second class mailing will reduce the time the magazine spends in transit from my post office to yours.

HOBBIES

I've been a ham for 32 years. Haven't been active all that time, but never got too far away from it. During the same time I've also devoted large blocks of time to automobile construction and restoration, computer construction and operation, and gardening, not to mention an Air Force career and raising a family. Once I began the FADCA > BEACON, I realized publishing had become an additional hobby for me. It is fun in its own right, as well as being part of the amateur radio packet movement. Unfortunately there is only so much time in a day, and if you cheat your sleep too often, you end up with a bad disposition and harm your health. There are so many improvements Brad and I want to make to PRM, but merely getting each issue out is a crisis each month. The publication has become too much for two hobbiests to handle. I am afraid there is not an easy solution. Fear not, I won't let PRM go down the drain, but it doesn't appear likely that we will get back on schedule very soon. To me, on schedule means the issue being mailed at the beginning of the month printed on the cover.

Combining PRM and TAPR's Packet Status Register has been a regular topic of discussion for over a year. Recently it came under serious consideration by the TAPR people. I hope the details will be able to be resolved. A combined publication would have a much larger circulation (more efficient printing), reduce my personal workload from 16 issues per year to 12 (which might get PRM on schedule), provide more

More >>>

material for publication each month (no need to decide which publication an article should go into), and get the same news out to more people. Let me know what you think of the idea, and if you are a TAPR member, let them know your feelings also.

There have been offers of assistance with editing and printing the PRM, but typically they come from out of the local area. Hawaii and Texas were the sources of several good offers of help. To date, I have not figured out how to make use of those offers. If the magazine were operated on a professional basis, with issues planned several months in advance, there would be time to transfer materials back and forth to these remote sites. As it is, by the time we define what help is needed, only local sources will be able to do it in time. The primary way persons can help is by submitting material for publication in finished form on diskette or via elecronic means.

Your patience with the problems causing the lateness of each PRM is appreciated.

COLOR MAIL IS . . .

The following was downloaded from Compuserve. It isn't exactly written in PRM style, but it should be provocative reading for packeteers. These folks aren't concerned with making the network run, only using it. And look what they are doing. They've got the beginnings of a graphics standard in that Apples and Commodores can exchange scenes.

"Yowzah! Color Mail the Electronic Greeting Factory is finally here and you can now send monitor-to-monitor graphic greetings complete with music, sounds, lots of color and texture, timing, and motion. Thank you, Hallmark. Thank you.

No lie! Forget about using line after line of dinky, boring type to express yourself. That stuff's over! E-Mail's stationary and Color Mail's on the move.

Create virtually millions of different greetings using pre-designed elements from such transcendently cool Libraries like: Characters, Creatures, Special Effects, Holidays, Music, Treasure Chest, Performing Words and other zingers.

You assemble your greetings, notes, mini-stories or whatever off-line at no expense and then upload and download them on-line via EasyPlex. No fuss! No muss! No archaic paper! No paper cuts!

And, Color Mail comes with the superior sending and receiving capabilities of Vidtex which insures the accuracy and integrity of each greeting you send.

So, if you own an Apple II+, IIc or IIe, a Commodore 64 or 128, have at least one disk drive, belong to the CompuServe network, and want to send C-Mail to someone else on CIS with a Color Mail disk, you're in business! And best of all, Apple owners can send to Commodore owners and vice versa and because Color Mail makes for such compatible computing, you can create and send Color Mail to your heart's content."

73, Gwyn

- PRM -

Steam Powered Packet Radio

Barry Baines, WD4ASW

When the North Florida Chapter of the National Railway Historical Society ran a steam powered train excursion ("The Suwanee Steam Special") between Jacksonville, Fl. and Valdosta, Ga. during the weekends of Nov 9-10 and 16-17, 1985, they turned to the Southern Railway for the locomotive and cars, and relied on amateur radio for communications between the train and Valdosta.

One round-trip was run each day, leaving Jacksonville at 9:00 am and returning around 6:00 pm. The train was powered by Norfolk and Western (N&W) Class 'J' Number 611, a streamlined "Northern" (4-8-4 wheel configuration) type locomotive built in 1950. The train consisted of 23 cars, including a souvenir car, air conditioned coaches, open air coaches, a "recording car" (for audio and photo buffs to shoot pictures/tape without interference from other passengers), open air observation cars on the rear of the train, and a VIP car. The train carried over 850 passengers and crew on each trip. The crew included a five member Emergency Medical Team, who spent most of their time removing coal cinders from passengers who tried to look at the locomotive through open windows of the dutch doors while the train was moving.

Amateur radio played a significant part in the successful operation and the use of packet radio provided a new 'rail mode' for the packet recordbooks. A two meter VHF station was installed in the VIP car "Crescent Moon", with AC power provided by a motor generator on the car. The voice station consisted of a magnetic mount antenna on the top of the car,while a Yaesu FT-726R transceiver, KLM 10-160 linear amplifier, and power supply was placed in one of the bedrooms of the Crescent Moon. A packet system was installed for one day as well, consisting of a TAPR TNC-1 and a Zenith Z-29 CRT.

Barry, WD4ASW, served as the Communications Officer for the trip. Communications from Valdosta was provided by Tim Hardy, KC0PA, and Earl Needham, KD5XB. The most exciting amateur event was the successful use of packet radio from the Suwanee Steam Special. Direct connects up to 60 miles were achieved, as well as limited success using the Valdosta digipeater (the digipeater is located on a tower with the antenna mounted on the side opposite the direction to the train, resulting in limited success). To our knowledge, this is the first instance of packet radio being used aboard a moving steam train. Several interesting notes - it is difficult to use a keyboard on a train going 65 mph! Retries were always required -- a mag mount on top of a passenger car coupled with fading make for less than ideal transmission paths. In addition, AC voltage levels were inconsistent due to the fact that if the train slowed down, the voltage dropped!

Numerous messages between the train and Valdosta were made informing officals there of the train's location, ETA, and passenger count so the local band boosters could prepare chicken dinners for passengers.

- PRM -

Cactus Corner

Lyle Johnson, WA7GXD

Dayton was really a lot of fun this year (yes, I am writing this column a bit late...). It was good to see many of you. As usual, there were lots of comments about TAPR, several suggestions for improvements -- and a lot of enthusiasm for packet radio.

All four producers of the TNC 2 clones were at the show, and all had their wares to peddle. These units are not all identical, so if you are in the market for a high-performance TNC, check all the manufacturer's offerings. And of course, many other TNC designs were in evidence at the show.

I suppose the question I was asked most from new (and potential) packeteers was, "Which TNC should I buy?"

Of course, the answer depends on the use to which the TNC will be put, which computer you are using, whether you are interested in other digital modes besides packet, if you have an interest in HF packet, if you want to be able to use the upcoming packet satellites directly (instead of through a local "gateway"), if you want to be able to access higherspeed packet channels (such as 9600 baud), and so forth.

I will stick my neck out next month on this issue. I have operated all TNC 2 clones, TNC 1, HD4040, Kantronics Packet Communicator, the GLB PK-1 and the AEA PK-64.

I won't do a detailed review on these units, but I will point out what I found operationally and technically about them, and try to put them in perspective vis-a-vis packet operation in 1986 (and beyond).

What I promised for this month was a look at JAS-1 and a peek at RUDAK. Here goes...

JAS-1 (Japanese Amateur Satellite - 1) will be aboard a test launch of the Japanese H-1 rocket. It is due for a ride into earth orbit in August of this year (August 31 was the last date I heard).

JAS-1 will operate on Mode J. If you are a follower of Amateur satellites, you may recall that OSCAR-8, launched in 1978, carried a Mode J transponder provided by JAMSAT (Japan AMSAT). Mode J uses 2 meters for the uplink (to the satellite) frequency and 70 cm for the downlink (from the satellite).

In the case of JAS-1, the 2 meter uplink will be on 145.90 to 146.00 MHz using SSB or CW, but not FM. The passband will be inverted (so 2 meter LSB signals are translated to 70 cm USB signals) and be retransmitted on 435.90 to 435.80 MHz, with a telemetry beacon located at 435.795 MHz.

This is a conventional linear translator like the Mode B unit on OSCAR-10.

Unique to JAS-1, however, is the Mode JD transponder. And more than a transponder, JAS-1 contains a packet bulletin board system for message storage and forwarding, with a capacity of almost 1 million characters of data! This is an all-digital channel, with uplink channels at 145.85, 145.87, 145.89 and 145.91 MHz. These channels will run at 1200 baud, using a 2 meter FM trnamitter with data encoded in the Manchester format. I'll explain this in a moment.

The JD transponder will have a single downlink channel of 1200 baud using phase-shift keying (PSK) techniques on 435.91 MHz.

Why four uplink and only one downlink channel?

In a situation where ground stations can't hear one another's transmissions (often called the "hidden terminal" problem), collisions, or overlapping transmissions, may easily occur. Experiments conducted in the early '70s at the Universtiy of Hawaii showed that maximum channel efficiency under such circumstances was on the order of 18%. This would imply that the uplink channel capacity should be roughly five times that of the downlink for efficient usage. In the case of JAS-1, the uplink capacity is exactly four times that of the downlink.

JAS-1 is a pretty compact device, and simplification of the on-board electronics was a primary design goal. The designers of JAS-1 selected a method called Manchester encoding for the uplink channels to reduce parts count (and thus increase reliability) of JAS-1.

As it turns out, a very simple circuit may be used to combine the clock and data signals from a TNC to form a Manchester encoded signal. This signal may then be fed to the microphone input of a standard 2 meter FM transmitter to generate the required uplink signals.

As mentioned above, the downlink signal is PSK at 1200 baud. A special decoder is necessary to recover the clock and data signals from the spacecraft downlink and feed them into a TNC. TAPR has been working with JAMSAT to provide a cost-effective, easily duplicated modem especially for operation with a TNC 1 or TNC 2 and JAS-1.

In fact, any TNC that has a TAPR-standard modem disconnect should work with the modem adapter. It will also provide tuning indication and may be interfaced with late-model radios for automatic doppler tracking. I expect the July issue of PSR to contain detailed information this device (what? you're not a member of TAPR? Time to join!).

One final comment on JAS-1 for this month. The spacecraft is very power-limited, and the analog and digital transponders won't be able to operate simultaneously for any length of time. The digital portion probably won't be turned on by the command stations until the spacecraft has been thoroughly check out after launch, so don't expect to be able to use Mode JD until October or later.

More >>>

Operating under a very different philosophy, another packet experiment will be flying into orbit this year in the Amateur space program. Phase 3C, a high-altitude device similar to OSCAR 10, will contain a device called RUDAK. RUDAK is an acronym from German, but RUDAK is really a rather sophisticated digipeater.

Based on a CMOS 6502 microprocessor and the Zilog Z80/SIO chip (the one used for HDLC in the TNC 2), RUDAK will be able to see more than 40% of the earth at apogee, meaning we will have the opportunity to link continents every day, for hours at a time.

RUDAK has a single uplink frequency of near 1269 MHz, using PSK for the uplink at 2400 baud. The downlink will be near 435 MHz, running PSK at 400 baud. Again, note the uplink to downlink ratio, in this case a ratio of six. This is another approach to solving the hidden terminal problem by adjusting channel capacity.

It may not be as easy to access RUDAK due to the frequencies and modulation methods employed, but AMSAT-DL (German AMSAT), designers of RUDAK, will be publishing details for RF and modem gear to make the job easier. And gateway operation is certainly one method that may be employed to better utilize the resources that RUDAK will provide.

Phase 3C is scheduled for launch around year's end. As the time approaches, I will provide you with more details of this fascinating experiment.

Remember, next month we compare and contrast the various TNCs on the market. If you are on the fence over which unit to buy, you may find some help in this column.

Until then, happy packeting!

- PRM -

KEYS:/HEATH HD 4040 PRICE REDUCTION/

To: All
From: Pete WB9FLW
Subject: Heath HD 4040 Price Reduction

Dist: Open, however remove price information before uploading to the Amateur Packet Network

Just saw the new Heath Catalog, the HD 4040 TNC kit has been reduced to $199.95 and includes the Status indicator box and flat filter kit as well!

Also the description includes info on the WA8DED code for AX.25 Ver 2 capability.

Notice To All Tapr/Clone HF Packet Users

Recently Eric Gustafson, N7CL, and I re-examined the 300 baud HF modem demodulator circuit and concluded that the main reason people have difficulty tuning in HF packet with the standard 300 baud modem is that it tunes too critically. We have come up with what we think should be very close to the optimal performance of the 2211 demodulator circuit.

To change the standard 300 baud demodulator circuit to this improved version, locate header U34 on TNC1 and U19 on TNC2. The standard 300 baud version of this header contains a 226K resistor and a 510K resistor. These should be replaced by 180K and 750K, respectively. The result of these changes is that the tuning range should open up from about 10 Hz to around 50 Hz. Thus, you should experience reliable demodulation when the frequency tuned is within plus or minus 20 Hz or so of the true signal frequency.

We urge all HF packeteers using TAPR TNCs (original or clone boards) to make these changes as soon as possible. We also remind everyone that HF is becoming alarmingly crowded, and that unless sensible operating practice is followed, the channel will be useless.

Some suggestions concerning HF operation are:

1. Try to keep all packets below 80 characters in length.
2. Set MAXFRAME to 1. This will minimize transmission time.
3. Avoid multiple connections and digipeated packet operation.
4. QSY away from the standard calling frequencies as soon as possible.
5. Set FRACK to a sensibly long value.

We hope these modifications improve matters on HF, and would VERY GREATLY appreciate hearing from any of you who make this modification and are able to compare the new behavior to the previous behavior.

73,
Dan Morrison, KV7B
Eric Gustafson, N7CL

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Auto / Answer For The TRS–80 Model 100

The Auto/Answer system written for the TRS80 Mod 100 consists of two programs, SETUP.BA and ATOPAK.BA. The setup program configures the TNC for the best operating parameters for the Auto/Answer system and automatically loads the AUTOPAK.BA program (provided that you have saved it with that filename).

There are two SETUP programs in the file; one for TAPR type TNC'S and one for Kantronics TNC's. The explaination will assume use of the Kantronics TNC. You may change the parameters to suit your needs.. however.. if you do change them, the first TNC command MUST be "ECHO OFF" and the last tnc command must be "CONV", as once the tnc is in the CONV mode no more commands can be addressed.

The answer program basically sits waiting for the *** CONNECTING TO message and when received jumps to a routine that outputs a stored message that you have created with the M100 text editor called GREET.DO . Then whatever text is received is stored in a file created by the program called PAKMSG.DO . When the person disconnects the program sees the *** DISCONNECTED message and resets to the Waiting mode. Additionally this program also will receive forwarded messages from the WORLI forwarding system if the GREET.DO file is configured properly, more on that later.

To start off create your greeting and save it in memory as GREET.DO . Make sure to put a <CR> at the end of the text. All that's left to do is go to basic and run SETUP.BA and then turn on your tnc

[ed. note: For formatting purposes several lines were shortened by creating a subsequent line for part of a multiple line statement. These added lines have numbers ending in '5']

```
0 'SETUP.BA
1 'THIS PGM WILL SETUP TNC FOR AUTO/ANSWER AND AUTO LOAD ATOPAK.BA
2 'VER 1.1 BY J R HANNA JAN 1986
3 'modified for the TAPR TNC2 and clones by Karl Geng N1DL
10 CLEAR1000:MAXFILES=2:CLS
20 OPEN"COM:58N1E"FOROUTPUTAS1:OPEN"COM:58N1E"FORINPUTAS2
30 ONCOMGOSUB400
40 PRINT:PRINT:PRINT"TNC on 1200 Baud - turn it on now"
50 COMON
60 REM
70 IF INSTR(Z$,"Checksum")THEN PRINT"wait setup in progress";ELSEGOTO70
80 Z$=""
90 FORI=1TO1000:NEXT
100 O$="ECHO OFF":GOSUB500
105 O$="AUTOLF ON":GOSUB500
110 O$="MON OFF":GOSUB500
115 O$="CONOK ON":GOSUB500
116 O$="FLOW OFF":GOSUB500
117 O$="TRFLOW ON":GOSUB500
118 O$="TXFLOW OFF":GOSUB500
119 O$="XFLOW OFF":GOSUB500
120 O$="MYC N1DL-1":GOSUB500
130 O$="COM $04":GOSUB500
140 O$="UN CQ V KT1K-1":GOSUB500
150 O$="CHECK 12":GOSUB500
160 O$="CONS ON":GOSUB500
350 DA$=RIGHT$(DATE$,2)
351 DA$=DA$+LEFT$(DATE$,2)
352 DA$=DA$+MID$(DATE$,4,2)
353 DA$=DA$+LEFT$(TIME$,2)
354 DA$=DA$+MID$(TIME$,4,2)
355 DA$=DA$+RIGHT$(TIME$,2)
370 O$="DA "+DA$:GOSUB500
380 O$="CONV":GOSUB500
390 COMOFF:CLOSE:RUN"ATOPAK.BA"
400 IFEOF(2)THENCLOSE2:OPEN"COM:58N1E"FORINPUTAS2:COMON
410 C$=INPUT$(1,2):PRINTC$;:IFC$=CHR$(10)THEN RETURN
420 Z$=Z$+C$
430 RETURN
500 IFC$=":"THENZ$=""ELSEGOTO500
510 FORI=1TO10:NEXT
520 GOSUB600
530 FORI=1TO10:NEXT
540 RETURN
600 FORX=1TOLEN(O$)
610 S$=MID$(O$,X,1)
620 PRINT#1,S$;
630 PRINTS$;
640 FORT=1TO10:NEXT
650 NEXT
660 PRINT#1,CHR$(13);:PRINT
670 RETURN
```

```
0 'SETUP.BA
1 'THIS PGM WILL SETUP TNC FOR AUTO/ANSWER AND AUTO LOAD ATOPAK.BA
2 'VER 1.1 BY J R HANNA JAN 1986
3 'WRITTEN FOR THE KANTRONICS TNC..MAY BE MODIFIED FOR OTHER TNC'S
10 CLEAR1000:MAXFILES=2:CLS
20 OPEN"COM:58N1E"FOROUTPUTAS1:OPEN"COM:58N1E"FORINPUTAS2
30 ONCOMGOSUB400
```

More >>>

at the Prompt..the program answers the 1200 baud "HIT (*) TO SET BAUD RATE" prompt and configures the TNC then loads and runs ANSWER.BA. You will then get this display:

```
MAILBOX ACTIVE - WAITING CONNECT
24358 BYTES FREE      0 MESSAGES ADDED

<P>rint Msgs    <V>iew Msgs   <E>xit
<K>ill PAKMSG.DO    <G>o Online

ENTER CHOICE IF DESIRED..
```

This is the Waiting Mode. Then any time a message is received it stores it in PAKMSG.DO and then on DISCONNECT checks the remaining memory clears the screen prints remaining memory and how many message have been received. If on the memory check the available memory is less than 1000 bytes it closes all files and returns to the Main Menu. You may exit the program at any time by hitting an "E" which returns you to the Main Menu. Hitting a "P" or a "V" drops you to a routine which will allow you to view or printout the file, after which you will be returned to the Waiting Mode. A "K" will kill the the PAKMSG.DO file. You may re-enter ATOPAK.BA if you leave BASIC without using SETUP.

Hitting a "G" from the main menu gets you to a built in terminal program. This is usefull if you want to chat with someone who has connected or for any connects you want to make. It negates the need to jump to TELCOM to initiate a connect. This is the display you get in <G>o online mode:

```
*** ONLINE ***
^D To cmd:
<ESC> to Return
```

```
40 PRINT:PRINT "KANTRONICS PC (VER 2.0) AUTO SETUP"
45 PRINT:PRINT"TURN ON TNC NOW .. "
50 COMON
60 REM
70 IF INSTR(Z$,"RATE")THENPRINT"*";:PRINT#1,"*";ELSEGOTO70
80 Z$=""
90 FORI=1TO1000:NEXT
100 O$="ECHO OFF":GOSUB500
110 O$="MON OFF":GOSUB500
120 O$="RING OFF":GOSUB500
130 O$="COM $04":GOSUB500
140 O$="UN CQ V KE1G-1":GOSUB500
150 O$="CHECK 12":GOSUB500
160 O$="CSTAMP ON":GOSUB500
350 DA$=RIGHT$(DATE$,2)
351 DA$=DA$+LEFT$(DATE$,2)
352 DA$=DA$+MID$(DATE$,4,2)
353 DA$=DA$+LEFT$(TIME$,2)
354 DA$=DA$+MID$(TIME$,4,2)
355 DA$=DA$+RIGHT$(TIME$,2)
370 O$="DA "+DA$:GOSUB500
380 O$="CONV":GOSUB500
390 COMOFF:CLOSE:RUN"ATOPAK.BA"
400 IFEOF(2)THENCLOSE2:OPEN"COM:58N1E"FORINPUTAS2:COMON
410 C$=INPUT$(1,2):PRINTC$;:IFC$=CHR$(10)THEN RETURN
420 Z$=Z$+C$
430 RETURN
500 IFC$=":"THENZ$=""ELSEGOTO500
510 FORI=1TO10:NEXT
520 GOSUB600
530 FORI=1TO10:NEXT
540 RETURN
600 FORX=1TOLEN(O$)
610 S$=MID$(O$,X,1)
620 PRINT#1,S$;
630 PRINTS$;
640 FORT=1TO10:NEXT
650 NEXT
660 PRINT#1,CHR$(13);:PRINT
670 RETURN

*** CHOOSE WHICH SETUP PROGRAM NEEDED AND DELETE ONE NOT NEEDED
*** THEN LOAD INTO BASIC UP TO HERE..THEN DELETE FIRST PROGRAM
*** AND THIS LINE..THEN LOAD SECOND PROGRAM

0 'ATOPAK.BA
1 'AUTO/ANSER PROGRAM BY J.R. HANNA MODIFIED BY DICK ROUX N1AED
2 'FEB 1986..CREATE A FILE CALLED "GREET.DO" THAT IS SENT OUT ON
3 'A CONNECT.  CHANGE NAME TO YOURS IN LINES 950,1000,1010,1020
4 'HAS A PAGING ROUTINE WHEN PERSON CONNECTING SENDS ^G...ADD
5 'THAT FACT TO WELCOME MESSAGE ! HITTING <G> AT MAIN MENU SENDS
6 'YOU TO A BUILT IN TERMINAL PROGRAM TO CHAT AFTER A CONNECT IF
7 'DESIRED.
8 'TNC MUST BE MODIFIED WITH;COMMAND $04;ECHO OFF;MONITOR OFF;CONV
10 CLEAR1000:MAXFILES=4:FL=0:MR=0:C=0:L=0:CR$="":CALL16969
20 OPEN"COM:58N1E"FOROUTPUTAS1:OPEN"COM:58N1E"FORINPUTAS2
30 ONCOMGOSUB210:ONERRORGOTO740
40 GOSUB100
50 COMON
60 E$=INKEY$:IFE$=""THEN60
70 ONINSTR("EPVKG",E$)GOTO500,530,590,650,680
80 ONINSTR("epvkg",E$)GOTO500,530,590,650,680
90 GOTO60
100 CLS
110 ' *** MAIN MENU
120 PRINT"MAILBOX ACTIVE - WAITING CONNECT"
130 PRINTFRE(0);" BYTES FREE      ";MR;"MESSAGES ADDED"
140 PRINT
150 PRINT"<P>rint Msgs   <V>iew Msgs   <E>xit"
160 PRINT"<K>ill PAKMSG.DO   <G>o Online"
```

More >>>

The COMMAND has been changed to CNTL-D. Reason is is that CNTL-C in MOD100 Basic is the BREAK Command. Hitting <ESC> gets you back to the waiting mode.

The program also has a Paging routine. If the person sends a CNTL-G, then the program will page you for 30 sec. You will see this:

W1XYZ Wants to Chat...
hit <G> to go online

Hitting a "G" will send you to the built in terminal program. If you don't wish to chat he will get a "sorry guess Dick is not around" after the 30 sec. page. Make sure to mention the fact that you can be paged in your GREET.DO messasge. Change the names in the paging routine to yours. The Paging routine checks the M100 clock and will NOT page you between the hours of 12 A.M. and 9 A.M.

Now more on the ability to receive forwarded messages.. All you have to do is end your GREET.DO with a ">" and a <CR> then follow with two one character lines w/<CR>'s..I.E.:

Welcome to the M100 Mailbox (a CNTL-G Pages Dick)>
*
*

This signals the forwarding BBS to send the message..Then the BBS sends a CNTL Z which triggers the program to send the GREET.DO again which signals the BBS that all was received. If there are no more messages it disconnects and you reset the waiting mode. Thats all there is to it. Of course you must be on the BBS'S auto forward list message.

```
170 PRINT
180 PRINT"ENTER CHOICE IF DESIRED.. ";
190 RETURN
200 '*** INPUT FROM RS232 ROUTINE
210 IFEOF(2)THENCLOSE2:OPEN"COM:58N1E"FORINPUTAS2:COMON:FL=1
215 FORI =1TO1000:NEXT:CLOSE3:GOTO310
220 C$=INPUT$(1,2):PRINTC$;:IFC$=CHR$(10)THENRETURN
230 IFC$=CHR$(13)THENGOTO260
240 Z$=Z$+C$
250 IFLEN(Z$)=>78THENGOTO260ELSERETURN
260 IFNOTCTHENGOTO300
270 IFCTHENGOTO430
280 Z$="":RETURN
290 '*** CHECK FOR A CONNECT
300 IFNOTLANDINSTR(Z$,"*** CON")>0THENC=-1ELSEGOTO280
310 IFFL=0THENGOSUB860
320 COMSTOP
330 OPEN"GREET.DO"FORINPUTAS3
340 IFEOF(3)THENCLOSE3:GOTO390
350 LINEINPUT#3,O$
360 GOSUB780:FORT=1TO20:NEXT
370 GOTO340
380 '*** OPEN MESSAGE STORAGE FILE
390 OPEN"PAKMSG.DO"FORAPPENDAS3
400 PRINT#3,Z$:PRINT#3,CR$
410 COMON:GOTO280
420 '*** CHECK FOR DISCONNECT
430 IFINSTR(Z$,"*** DIS")THENC=0:GOTO470
440 IFINSTR(Z$,CHR$(7))>0THEN:PRINT#3,Z$:Z$="":GOTO940
450 PRINT#3,Z$
460 GOTO280
470 FORI=1TO4:PRINT#3,CR$:NEXT:CLOSE3
480 IFFRE(0)<1000THENGOTO500
490 FL=0:MR=MR+1:GOSUB100:GOTO280
500 COMOFF:CLOSE
510 DATE$=LEFT$(DATE$,6)+"86"
520 MENU
530 COMSTOP:CLS
540 '*** PRINT MESSAGES
550 PRINT:INPUT"CHECK PRINTER - PRESS ENTER.. ";X$
560 OPEN"PAKMSG.DO"FORINPUTAS3:OPEN"LPT:"FOROUTPUTAS4
570 IFEOF(3)THENCLOSE3,4:GOTO40
580 LINEINPUT#3,C$:PRINT#4,C$:GOTO570
590 COMSTOP:CLS
600 '*** VIEW MESSAGES
610 OPEN"PAKMSG.DO"FORINPUTAS3
620 IFEOF(3)THENCLOSE3:GOTO40
630 LINEINPUT#3,C$:PRINTC$
640 FORI=1TO500:NEXT:GOTO620
650 KILL"PAKMSG.DO"
660 GOTO10
670 '*** TERMINAL PROG.
680 CLS:L=-1:PRINT"*** ONLINE *** ":PRINT"^D To cmd:"
685 PRINT"<ESC> to Return"
690 E$=INKEY$:IFE$=""THEN690
700 IFE$=CHR$(27)THENL=0:GOTO40
710 IFE$=CHR$(8)THENPRINTCHR$(8);CHR$(32);
720 PRINT#1,E$;:IFE$=CHR$(13)THENPRINTE$ELSEPRINTE$;
730 GOTO690
740 CLOSE:PRINT:PRINT"ERROR ";ERR;" IN LINE ";ERL
750 INPUT"RECORD ERROR THEN PRESS <ENTER>.. ";X$
760 RESUME20
770 '*** OUTPUT TO RS232 ROUTINE
780 FORX=1TOLEN(O$)
790 S$=MID$(O$,X,1)
800 PRINT#1,S$;
810 PRINTS$;
820 NEXT
830 PRINT#1,CHR$(13);:PRINT
840 RETURN
```

More >>>

What's In A Layer ? Or Why Layer Three Is Not Linking

Lynn W. Taylor, WB6UUT

I have been reading a lot of papers recently discussing some planned hardware, and some "wish lists" for layer 3 (and higher) protocols. In most of these, it seems to me that the authors have drifted from the goal of defining what should be done at the Communications Subnet level (layer 3) of the ISO model. To explain this level as I understand it, I am going to present an analogy, discuss the issues I feel are and aren't important, and suggest why layer 3 and linking should be considered together. Finally, I will present my layer 3 "wish list."

As a brief review, layer 1 (physical) gives us a communications media or channel. Our specific choices on this later are Radio, HDLC, Bell 202 and 1200 baud; it does not deal with error rates or channel sharing.

On layer 2, we take our channel resource and split it up (in time) into 'virtual' channels, and we take steps to insure a (nearly) error free channel. Our specific layer 2 is AX.25, which defines a Local Area Net, and provides a means to extend the LAN where signal propogation is inadequate to allow the most distant users to communicate (digipeating). In the Los Angeles/San Diego LAN, the most distant users are over 120 miles apart; the user must have some knowlege of the network topology (who can hear whom) in order to communicate with other users.

Another network worth considering is the telephone system. In this network, we have a physical level (baseband audio on wires), a data link layer (the local office switch), and a good example of a communications subnet layer. Layer 1 is handled by wire. On layer 2, 10,000 users (which share a prefix) can be directly connected together by switches in a single exchange. On layer 3, things get more complex. While only a short distance apart, it is not possible for my phone (497 prefix) to be connected to my parents (494 prefix); we are in seperate "local networks" or local exchanges. In this trivial case (both exchanges are in the same building), my exchange selects a 'trunk' which connects it to the other exchange, and then on to the call's destination.

In the case of a longer call (from my home in Southern California to Pete Eaton in Saint Louis, for example), I "invoke" a long range network (which my exchange knows how to access), and trunks are selected connecting to various switching centers, into Pete's exchange, and on to Pete's phone.

The important thing to note here is that, as far as I can tell, my phone can directly be connected to any phone in my local dialing area (a geographically large LAN), or any other phone in the world -- without my knowing (or even being able to find out) which trunks, exchanges, routing centers, etc. are involved. In other words, the task of the communications subnet layer is to make it appear that every station in the net can be directly connected to every other.

As a user in the LAN, what I should be able to do is exactly the same as when I dial my telephone -- connect to any other station by simply specifying the call sign of that station. The connect may fail because the destination node is down, busy, or simply unreachable. In a seperate paper, I have suggested a decentralized mechanism which would allow dynamic routing of packets as the network changes -- other algorithms are possible, including centralized and hybrid networks. What ever method is finally chosen, it should appear to the user that every station in the net can talk directly to every other node in the net.

More >>>

One other nicety...The program contains a look-up table of names referenced to call signs. So when AB1Q connects, he gets a nice "Hello Dan..." before the GREET.DO message. If no match is found it just outputs "Hello There". Change these to all your buddys calls. This program is not guarranted to be bug free. If you can, go ahead and improve it. This is how Hank's (WORLI) BBS software got started.

If you find any bugs or there are questions just drop me a line...N1AED @ WORLD GOOD LUCK !!!

```
850 '*** CALL SIGN LOOK-UP TABLE
860 ZC$=MID$(Z$,18,6)
870 IFINSTR(Z$,"AB1Q")THENO$="Hello Dan...":GOSUB780:RETURN
880 '
890 '** ADD MORE LINES HERE IF MORE CALL SIGNS HERE ARE DESIRED **
900 '
910 IFINSTR(Z$,"WA1ZZC")THENO$="Hello Don...":GOSUB780:RETURN
920 O$="Hello There...":GOSUB780:RETURN
930 '*** PAGING ROUTINE
940 IF VAL (LEFT$(TIME$,2))=<8THEN O$="Sorry..Paging disabled until 9 A.M. >"
945 GOSUB 780:GOTO40
950 CLS:O$="Paging Dick...(for about 30 Sec.) >":GOSUB780
960 PRINT:PRINT ZC$;" Wants to Chat..."
970 PRINT:PRINT"hit <G> to go online"
980 FORI=1TO175
990 FORP=1TO10:NEXT:BEEP
1000 E$=INKEY$:IFE$="G"ORE$="g"THENO$="Dick is at the keyboard...Standby! >"
1005 GOSUB780:COMON:GOTO680
1010 NEXT:O$="Guess Dick is not around...Sorry":GOSUB780
1020 O$="Feel free to leave Dick a message...73 & TNX >":GOSUB780:GOTO40
```

- PRM -

Notice that many of these statements are as valid for a long-distance network (AMICON) as for a local network, and pehaaps even mre valid. It should not be necessary for me to specify that my data be transferred via Los Angeles, Las Vegas, Salt Lake City, etc. to get to Saint Louis; especially if the route via San Diego, Tucson, Taos, Houston, etc. is less congested, or if a critical node is down along the other route.

I am concerned when other issues start "invading" the communications subnet, such as non-connect communications, such as sattelite (PACSAT) routing, and mail-type services. In the case of message traffic, Bulletin boards and PACSAT gateways can provide the necessary store-and-forward services. In order to incorporate this in a protocol, w must deal with such issues as how to store this data (provide some nodes with lots of memory?), how to access this distributed database, and how long to keep these messages around. In my opinion, this is an application of the network best dealt with at the application level (layer 7).

In the phone system, special procedures are necessary to access the long-range network (dialing '1'). I don't think it is unreasonable to set up a gateway to a long-haul network, and require the user to connect to this station to access distant networks. A question here is, do I want my TNC to indicate that I am connected to the distant station, or is it OK or me to be connected to the gateway itself. A good option here might be to connect to the linker, give it the call I want to talk to, and disconnect, allowing it to connect (at layer 3) to me when the path is established.

In other words, we want a communications subnet to be usable without any specialized knowlege of it's topography. In order to reach this goal, layer 3 is concerned with routing; it does not state whether we are extending our LAN, or linking distant networks.

While these are seperate issues, I don't think one can be considered without the other. On one hand, linking LAN's is much more difficult if you must give detailed routing information; some kind of layer 3 is almost essential for the long-haul net On the other hand, the LAN layer 3 would require each node to have some information about the network it's in; if a long-haul gateway knows who it can reach in it's LAN, it can be queried for a specific station -- this query could provide a "directory assistance" function. Using "area codes" suggests that a "packet directory" would need to be published. A scheme allowing a query throughout the long-haul network would handle this case, and also allow me to travel to another area and receive connects through the appropriate gateway.

Now that I have presented some of my thoughts on the topics of linking and layer 3, I would like to present my "wish list." I would like to see a communications subnet layer running on the TNC in the LAN, allowing me to connect to any station in the net by requesting a connect to that station. I want the algorithm to be able to handle changing topography (due to stations going on/off line, or changing propogation and dynamically re-route my packets; this does not allow for a user-specified routing, since the network has the authority to change the routing. I want a similar capability to exist in the long-haul network, plus a 'directory assistnce' capability allowing me to access a station by call sign without knowing exactly where he is in the net.

I think this is attainable using present hardware. As I discussed in my previous paper ("A Proposed Layer 3 Routing Algorithm"), I feel it is possible to have dynamic routing in a connection environment. The tables necessary to handle this in the LAN make the necessary data available to the long-haul net. This will allow a smoothly operating local net, and an easily accessable long-haul network which is fairly tolerant of failures; it should also be simple enough to implement.

- PRM -

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AEA is proud to announce a new award designed to recognize amateurs who promote amateur radio to those outside the hobby. This award will be open to nominations from May 1, 1986 to August 15, 1986. During this time, any licensed amateur can nominate any other licensed amateur for consideration. All nominations must be made on the AEA Amateur Ambassador Nomination Form which is available from AEA, P.O. Box C-2160, Lynnwood, WA 98036, SASE please.

This award will be judged on the criteria of dedication to amateur radio, influence on others outside amateur radio, and initiation of special projects or programs to promote amateur radio. A panel of judges selected by AEA will select the winner and any additional honorable mentions. The decision of the judges will be final.

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Sincerely,
Advanced Electronic Applications
-signed-
C. Mike Lamb
President

- PRM -

BBS Compatability

Frank McPherson, KB7TV

Hank, WORLI has done the fantastic job of supplying the amateur packet community with a super Bulletin Board System (BBS). The system will handle different types of traffic in the form of messages, bulletins, mail , or even traffic for the National Traffic System. It provides for automatic forwarding at requested times to another WORLI BBS. It provides a means whereby a user may have access to a set of files of miscellaneous content. These can range from documents to programs in ASCII format. Any of these files can be downloaded by the user to the user's computer for use there. The user also has the ability to upload from the user's computer to the BBS.

The user may use the BBS as a Gateway. This means that a ham on VHF may activate the Gateway, and then have access to the HF bands. While in this condition, the user can call CQ, call a particular station, access a BBS, or access another Gateway. If the user activates another Gateway, then the user may then give a call to a particular station, BBS or a CQ on the VHF frequency that is serviced by the other Gateway.

The BBS can keep a log of the stations that the BBS has heard on both VHF and HF. It can also keep track of the stations that has connected to it and the name of the person assigned to that call.

For each user, it keeps a record of the name of the user, the last time the user has signed on and the path that was taken. Also, any special information such as any sub id (IE KB7TV-1), any special privilege such as remote sysop, which of the two TNC's the user used, and if the user is a BBS. It also knows what new mail has been placed on the BBS since the user last signed on.

Each message or piece of mail also contains its own header. This header consists of the address of the station the message is going to, who originated the message, at what BBS the message is to be forwarded to, the title of the message, the forward disposition code, and the type of message. The message types can be either, bulletins, personal, or NTS.

The automatic forwarding is done by a file called FWD.TNC. This files contains a header for each BBS which contains the hour to activate the auto-forward process, the hour to deactivate it, the TNC to be used, and the command to send to the receiving BBS. (IE C K4NTA V STU). The minute of the hour to activate the auto-forward process is contained in the configuration file. This header is then followed by a list of all of the amateur calls that are to have their mail forwarded to that BBS. This group is ended with '*** EOF'. Another section of the FWD.TNC file provides for any special commands to be sent to the TNC such as 'MAXFRAME 1'.

This BBS also sends out beacons that tell you who has mail waiting for them, and any special message the sysop would like to put out.

A configuration file is used by the program so that the sysop can configure his/her own system. Too many items are contained in the configuration file to go into in this article.

There is a good help facility in the form of extende menu definitions in the config file. There is also, a complete set of operating instruction in a file call BBS.DOC that may be downloaded

All in all, a very high quality, complete BBS that has been written and implemented for the amateur packet community. It is very widely used on both HF and VHF. It has become the 'Industry Standard' for Amateur Packet Radio.

There are two problems, however. This BBS was written for the Xerox 820. These computers are inexpensive which is good. They are also becoming harder to come by. Consequently, other forms of BBSs are popping up. The instruction set is different and the functions are not as complete.

It would be wonderful to be able to find an answer to thse problems. Well, someone has. Jeff Jacobsen, WA7MBL, along with help from Tom Hogan, WB7DCH, John Pearce, WB2MNF, and especially Hank Oredson, WORLI, have teamed together to produce a WORLI BBS for the IBM PC. TAPR has also helped support the effort. The programs were written in Turbo Pascal.

This now provides a compatable BBS with the renown and ever popular WORLI BBS. It provides it on a computer that is not hard to find, only hard to afford. The added versatility and available disk space along with increased computer and access speed can open the door for more capabilities.

The official release of the code is supposed to be version 2.05. I have been running with version 2.04 for quite some time. I have run it on VHF with the TAPR TNC 2, and on HF with the Kantronics KPC-2. I have just set up the gateway function. The only function that seems to be missing on the gateway function is the ability to monitor calls. On the WORLI BBS, there is a command to allow you to do this. The command is 'M' and does not exist on the IBM-PC version. Maybe in the future.

The package comes complete with a TNC1.SET and TNC2.SET file which can be used as is without any modifications. All I did, was to set AX2512V2 on. Martin (KA6ADB) has used the TNC1.SET for his BBS. I have only used the TNC2.SET. Also in the package is an overlay file, a sample configuration file, and skimpy documentation.

The installation was still quite simple, after I weeded through the documentation. I was looking at the documentation several times and still found new things in it. The BBS has it's own sub-directory on my fixed disk with two sub-directories. One is called FILES and the other is MAIL. These are both under BBS subdirectory. All of the programs, FWD.TNC, configuration file, etc. reside in the BBS sub-directory. Any file you wish to allow the user access to will reside in the FILES sub-directory. All messages will be placed in the MAIL sub-directory. The names of these sub-directories are changable in the configuration file and consequently are not mandatory.

Continued on page 14 >>

NEW *** PAK-COMM *** NEW

The PAK-COMM program is written for packet radio terminal controllers. The program enables the operator to enjoy the uses that packet radio offers by taking care of the housekeeping, and provides the little 'extras' that make daily operations easy. Use PAK-COMM for both modem and packet work.

Com Parameters:	300-9600 bps, set port, parity, data bits. A start-up file with pre-defined communication parameters, file transfer protocols, date/time stamp options, operator identification line and space for command macros. Set up many files, pick at run time.
Scrolling Pages:	Five pages of receive screen with full cursor control.
Split Screens:	Separate transmit and receive screens with full line buffering for the transmit. This will enable you to monitor all channel activity while composing messages. Set split where you wish.
File Transfers:	You may use transparent or x-modem protocol. Constant character count is provided to monitor activity.
Command Macros:	The Alt function keys are available to send strings of up to 250 characters or timing loops that are sent to the controller in one keystroke. Setup complex rpt chains or BBS logons.
Help Screens:	Two individual help screens are available. one is a text file to be modified by the user. A good place for system maps.
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Dual-Port Digipeaters, K9NG Modems and FAD Boards

Orv Beach, WB6WEY

Over a year ago, Steve Goode, K9NG, demonstrated the feasibility of running 9600 baud data over a VHF radio link using the 9600 FSK modems he had designed. Almost at the same time, Jon Bloom, KE3Z, published source code for a digipeater capable of of supporting several ports, and routing packets between them, giving some rudimentary packet switching capability. After much work building, testing and modifying, we finally are on the air! We are using Xerox 820 computer boards with modified FAD boards with good success running a modified version of KE3Z's multi-port digipeater code. We are currently doing on the air testing of two dual-port machines running K9NG modems at 9600 bps against Midland 13-509's on 220.950 MHz on one port of each machine and 2-meter VHF FM radios on the other channels, one on 145.01, the other end on 145.03, which yields an interesting test setup. The K9NG modems when built and aligned properly operate quite well. As predicted by Steve in his article, the modems show some advantage compared to the Bell 202 modems used by most TNC's; the radio/modem combinations show very good performance down to S3-S4.

The FADCA 'FAD' board is an adapter circuit board intended for use with a Xerox 820 computer board. It allows the connection of a Zilog 8530 SCC (Serial Communications Controller) to be attached for communications purposes. The SCC has a number of advantages and several disadvantages compared to the SIO. Its advantages are the inclusion of independent baud rate generators for each channel, capability to run NRZI, plus some additional features not included in the SIO. Its disadvantages are lack of direct Z80 bus compatibility, and increased programming complexity.

The principal advantage in using the FAD board is that the external 'state machine' board is no longer needed. The FAD board is designed for mounting on top of the 820 board, making a neat installation.

The FADCA FAD board includes a single SCC, Z80 bus adapter circuitry, a baud rate crystal, and two channels of RS-232 drivers for data and some controls (but no clocks - it was intended for NRZI applications).

The board as designed is useful but needs certain modifications to be more usable in a packet radio environment. A peculiarity of the SCC is that the DPLL (digital phased-locked loop) won't start running till it hears a signal. Since in the existing circuity the transmit clock is derived from the DPLL output, the rather peculiar constraint exists that before the FAD board can transmit, it has to have received at least enough of one frame to kick off the DPLL. (You can't transmit until you receive!) One of these changes fixes that problem. The modification allows the BRG X32 clock output to be routed external to the SCC, divided by 32, then routed back into the TX clock pin. This allows the SCC to function more properly in a NRZI environment.

This allows an additional modification to be incorporated. Since the SCC is programmed to provide an X32 clock on an external pin, this clock can be supplied to the DB25 connector for use with a K9NG modem, which requires either an X16 or an X32 clock.

Note that these clock path changes require corresponding changes in the SCC initialization routine in the resident software.

Here is a description of the modification: (See Figure 1)

Remove the existing crystal and toss it in the junk box.

Cut etches at the SCC at pins 12, 20, 26, and 28.

Add a socket for a crystal oscillator module in the kludge area of the board. (If your version of the FAD board has no kludge area - there were some made that way - my recommendation is to clamp a chunk of perfboard to it as a template, and drill perforations for your own kludge area.)

Wire the crystal socket for power and ground, and connect its output to pin 20 of the SCC.

Wire the clock divider circuits as a divide by 32; I used an 'LS393 and and 'LS74. The input to each divide-by-32 circuit is from the TRxC pin of that channel; the divider drives the RTxC pin of that same channel. Make sure you pull up all unused inputs. I used LS TTL parts as that's what I had in my junk box; CMOS equiva lents would probably also work ok.

Across the end of the +5 volt and ground lines on the edge of the kludge area, connect a .01 uF disc capacitor and a 10 uF tantalum capacitor. This is about all the filtering you need for the changes made.

Insert a crystal oscillator of a common baud rate frequency into the socket. The Zilog 8530 Technical Manual uses 3.9936 MHz as an example. 4.9152 MHz would also work. I used 5.5296 MHz as that's what I had laying around. (But don't go higher than 6 MHz, the SCC's frequency limit.) Note that if you want to run 9600 bps, 2.4576 MHz is about the lowest frequency oscil lator you can use (and still program the BRG for 32X 9600).

If you plan to run a K9NG 9600 baud modem on either channel, connect the TRxC pin for that channel to an unused pin on the DB-25 connector for that channel. I used pin 24; it's the external clock pin for synchronous data applica tions.

PROGRAMMING THE SCC CLOCK PATHS

In the initialization of an SCC there are up to 15 registers to program prior to operation. The principal ones of concern for the clock paths are Write Registers 4, 11, 12, 13, and 14. Here is a brief run-down of the pertinent bits in each register to set for common NRZI applications when the clock mods detailed earlier are installed:

Write Register 4

```
Bit 7 - 0 \_ this sets clock and data rates the same
Bit 6 - 0 /
```

More >>>

Write Register 11

Bit 7 - 0 TTL clock expected in on RTxC
Bit 6 - 1 \__ Receive clock from DPLL output
Bit 5 - 1 /
Bit 4 - 0 \__ Transmit clock comes in on RTxC pin
Bit 3 - 0 /
Bit 2 - 1 TRxC is output pin;
Bit 1 - 1 __ TRxC outputs baud rate generator
Bit 0 - 0 /

Write Register 12

Low byte of baud rate generator constant

Write Register 13

High byte of baud rate generator constant

The formula for calculating the baud rate generator time constant can be found on page 3-38 of the SCC Technical Manual, but is repeated for convenience:

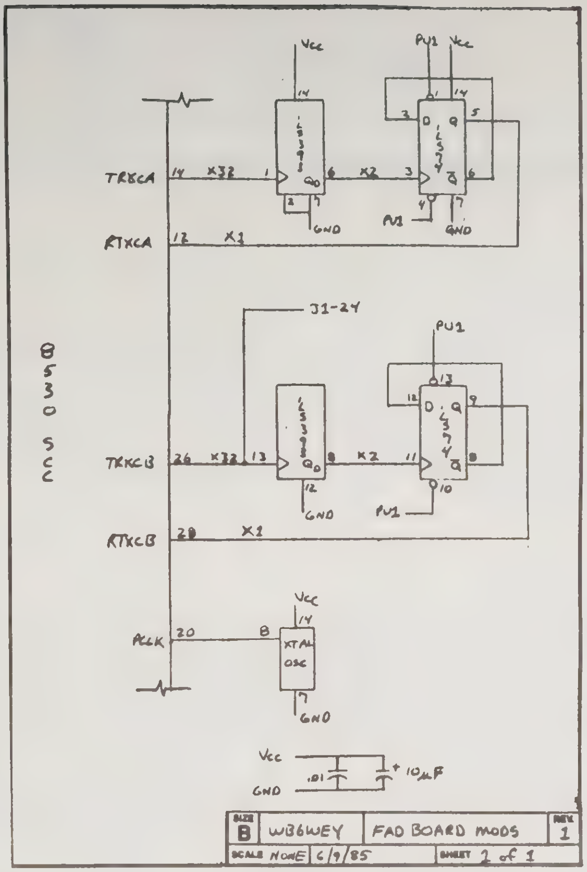
TC = [Clock Freq./(2*Baud Rate)] -2

HOWEVER - the above formula is for an X1 baud rate, and we need X32 times the data rate, so calculate a baud rate 32 times greater than you plan to use.

Write Register 14

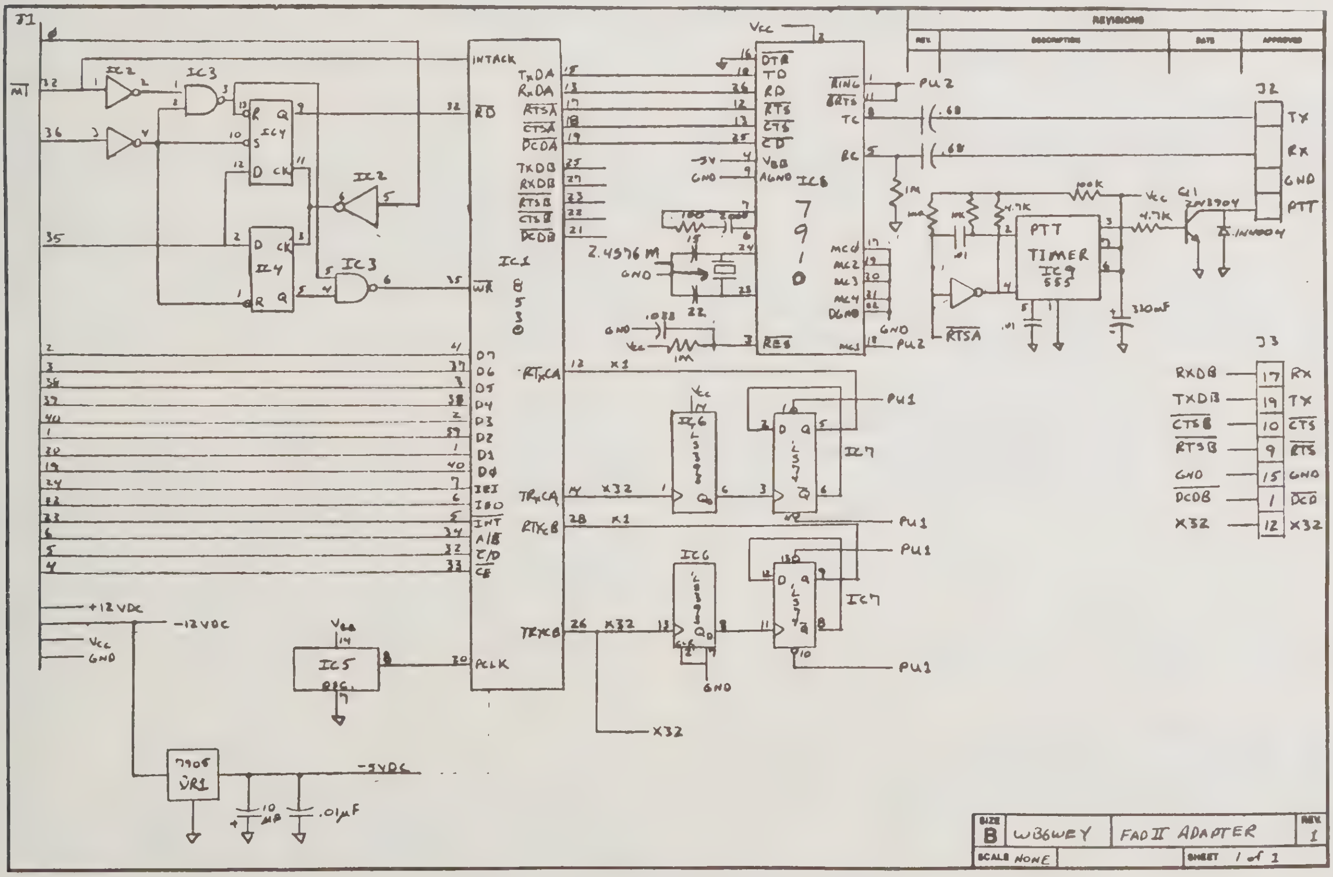
Bit 7 - 1 -- These are command bits;
Bit 6 - 0 | This command sets the DPLL source
Bit 5 - 0 _| to the BRG.

Bit 1 - 1 This selects PCLK as the source for the BRG.
Bit 0 - 1 Baud Rate Generator enable.



There are other significant bits to be programmed in the registers listed above, so be careful making changes.

More >>>



RADIO MODIFICATIONS

There are several things that need to be done to prepare a Midland 13-509 for digital service. Some of these are mandatory; others are optional.

We replaced the 4-pin accessory connector on the back of the 13-509 with an 8-pin of the same variety. The one we used was a Philmore T-700 which should be available at any electronics store.

These four changes are the bare minimum required to get on the air:

1. Disconnect the phase modulator and connect the fsk modulator as per Steve Goode's paper.
2. Connect the modem receive line to the discriminator of the 13-509. We connected at the top of R26.
3. Remove the deemphasis capacitor, C42.
4. Connect the PTT line to the modem.

The next step:

5. The T/R relay must be removed and replaced with a solid-state equivalent. We've not done this yet, but plan to use either PIN diodes and quarter-wave transmission lines, or M/A Com solid state TR relays. Either should work well.

If the radios are expected to operate throughout a wide temperature variation, the following changes must be made:

6. Replace the following Capacitors with 1000 pF silver mica: 112, 113, 119, 120, 124, 134, 135, 140, 141, 191, 194, 198, 199, 201, 202, and 215.
7. Replace C71 with a 120 pF silver mica cap.
8. Replace CF1 with a Murata CF4455C filter.
9. Update TR1 and TR2 with 3SK45's, or replace them with 3SK51's for improved performance.

If temperature variations are expected to be really extreme, it's highly recommended that both the transmitter crystal AND the MV2114 varactor diode be placed inside a crystal oven.

K9NG MODEM MODS

The K9NG modem was designed to operate with a Hamtronics radio. When using it with a Midland 13-509, several changes are required.

1. The modem was originally designed with a switched 9.1 V circuit in it. This was removed from our modems, as it wasn't needed.
2. In addition, the modem supplied a switched 12 volts to the Hamtronics radio. We removed Q2, R17, and R18, and used Q3 as a keying transistor for the PTT line in the 509. Other radios may need a heftier keying transistor.

Several other changes to the modem were made:

3. WB6YMH found the DCD line on the modem falsing frequently while receiving good frames. In an effort to reduce them, he changed C18 to .1uF, removed R30, and replaced R31 with a short. We implemented these changes in our modems.
4. While doing on the air testing, we discovered that the source of some occasional clobbered frames was the DCD interrupt generated when going into xmit occurring apparently simultaneously with a transmit interrupt and a real-time clock interrupt. (I say apparently because we haven't proved that that was the cause yet). Since a half-duplex modem should really only assert Carrier Detect during receive, as a quick fix I qualified DCD with PTT. When you go into transmit it forces DCD high. This appears to have fixed the problem. I did it by piggy-backing a 74LS32 on top of U6 on the modem, soldering pins 7,14, and 10 to U6. The other input pin of the 'LS32 is connected to pin 1 of the modem connector (DCD) and the output pin goes to the cable itself.

WHAT'S NEXT?

The Sulfur Mountain Repeater Association is currently building a 2-port upgrade for WA6ZSN-1, which operates on 145.03 and services a large portion of Ventura county. Tom, KA6SOX, and I are building a 4-port machine as an upgrade for KA6SOX-1, in Santa Barbara County, northwest of WA6ZSN-1. The next several upgrades contemplated are WA6OZJ, on the Palos Verdes penninsula (currently servicing the local packet community on 145.05). From his QTH Jim has an excellent shot both north to Ventura and Santa Barbara Counties, and south to San Diego. The next dual-port contemplated is a new installation in San Diego. The 2-meter port will probably be on 144.76, the local packet frequency. WB6HHV and WD6FPY are spearheading that effort. Establishing these machines with 220.95 MHz ports will allow packet users to bypass the busy Los Angeles basin, and create the beginnings of a high speed ham radio packet network.

ACKNOWLEDGMENTS

I'd like to thank:

Steve, K9NG, for providing the potential for higher speed data links.

Tom, KA6SOX, for providing and modifying the radios and for some valuable expertise.

Jon, KE3Z, for distributing some really neat, useful code.

Mike, WB6HHV, for valuable assistance.

And especially Steve, N6KHV, for pointing out the obvious.

- PRM -

BBS COMPATABILITY continued from page 10

The ability to go into terminal mode onto either TNC is very useful. This whole project has been very educational and fun. I will continue to keep abreast of any updates. New features and updates are said to be in the mill. Anything that Hank adds to his will be added to this version also. Much cooperation is taking place there. Feel free to call upon me for any questions regarding the program. I will try to answer them. I do not have the source but it should be available.

This is a very important step toward maintaing one command set for BBSs and many thanks are to go to the authors of this code and especially Hank, WORLI.

MARDA MONITOR

The Official Newsletter of the Mississippi Amateur Radio Digital Assn

If you have been following this column over the last few months it will be very easy to recall our comments regarding the need for a strong digipeater network. Here in the Magnolia State progress is being made slowly but surely. Lets take a look at what has been accomplished since we last connected via PRM.

HATTIESBURG LAN:

Under the leadership of Hank, K5QNE, the President of Hattiesburg Amateur Radio Club, the HUB CITY area now has a Digi on the air. With a lot of work from Ron, WB5TJK and Bob, N5IEL -- HBG <W5CJR-1> is awaiting your signals. In every cloud their IS NOT a silver packet, however. We were sorry to hear that the original antenna site for HBG did not pan out. A combination of transmission line/antenna (already on the tower) problems plus access to the equipment plagued the group so they were forced to look for another location.

Currently the system is operating from an area near one of the local hospitals. This is temporary until a better site can be found. The digi is using an AEA PK -80 with a Kenwood 7400A. The performance has been excellent within the LAN but connects to the Coast are not very reliable at the present time.

HBG has to see GPT <WA5DVV-1> in Gulfport in order for traffic to move from south Alabama/Louisiana to the north through the state. We hoped for a solid path between the two LAN's but a ridge near Wiggins, about half way in between, has been acting like a large sponge soaking up every signal in site. I thought the only hills we had in Mississippi were fire ant hills! Guess we learn something new everyday.

But have no fear as plans for a small low power, low height digi on top of that - hill - are now in the making. This mini-system is being designed to do nothing more than help 'make the trip' from Gulfport to Hattiesburg. When a permanent home is found for HBG and if this site makes for a better path to the Coast --- the mini-digi at Wiggins could be converted to another frequency for use in MARDA's Phase II backbone network. Now ... that's another story. Stay tuned!

VICKSBURG LAN:

Good news from the Vicksburg Amateur Radio Club. VKS (WB5SXK-1) is now on the air also using an AEA PK-80 and AZDEN PC-2000. Bill Ford (WB5SXK), President of the group, says the Digi seems to be functioning well. As of this writing the system just came up so tests are still underway. I did have the opportunity to work Bill via SLI (Slidell) and LFT (Lafayette) both in Louisiana during a recent early morning opening. Wish the path could always be this good between the two LAN's. Congratulations to VARC for turning on another part of the state to PACKET.

MENDENHALL LAN:

Here's one that really threw me. This town can be found on Highway 49 about 60 miles northwest of Hattiesburg and 45 miles south of Jackson. I wasn't aware of any amateur radio operation from this area not alone packet. But folks, I am here to tell you Mendenhall, MS has their very own Digi going under the alias of MDL <K5HYE-1>. Although I am poking fun here just a tad -- this digi, dedicated or not, will be a welcome addition to our net linking into Jackson. Will try to find out more about this one in the days ahead. K5HYE is John Statham and he's alive, well and on packet in Mendenhall.

BATON ROUGE LAN:

Although Baton Rouge in not a part of the MARDA network, the packeteers in this area of Louisiana have been working very hard in order to get a full time digi on the air. Because of this, I feel it is very important to mention the progress that has been made in our neighboring state.

BTR is now on the air from the 800 foot level on WBRZ TV-2's tower. Jack, WD5ELJ tells us there is still a null to the southeast which greatly affects the quality of the connect to Slidell/New Orleans and the Mississippi Gulf Coast. Every effort is being made to get this problem cleared up. BTR is one of the most important links we have as it provides the necessary path to the states (LA) capital. Good luck Jack and thanks for your perseverance.

ON TAP:

A look at the RLI GateWay as implemented at WA5DVV Hank Oredson (WORLI).

Until next month, may all your CONNECTS be many and RETRIES few. >

Patrick J. Fagan WA5DVV

FADCA > BEACON

THE FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION

Brevard LAN Meeting

Jim Schroeder, W4RXR

Twelve amateurs from the Brevard LAN gathered for an informal packet operaters meeting April 10 at the Satellite Beach Civic Center. Harry, W2IMA, arranged and hosted the meeting after discussions on the Brevard Packet Roundtable (Sundays, 8 p.m., 146.94 (-600) MHz) indicated a strong desire for a general, informal discussion of packet operation and equipment.

Over a two-hour period, many informative comments on equipment, BBS use and HF and VHF operation were exchanged. In addition, Dave, K3AAX, provided several stories of "early" (ca 1984) Brevard packet activity, including the events leading to the establishment of the current 305MLB site and the "famous" Melbourne Square Mall packet demonstration. In defiance of Murphy's Law, the portable packet station set up at the meeting worked successfully and several connections were made, including the activation of the K4NTA gateway in Stuart. Finally, the group forwarded their thanks to Howie, N2WX, for his past work in packet radio and offered ongoing support for his efforts.

- PRM -

Letters & Messages

Hello Gwyn! Long time no type! So glad you sent me a message about my request for a listing of packet operators callsigns and names. I am now running (on a semi-perm. basis) a WORLI BBS clone for the IBM-PC, The one written by Jeff, WA7MLB. I could send you my list of users and if all the BBS owners would do the same you could get a good cross section of the total users. I know that not everyone has or does check-in to a BBS but most folks do at least once, but that's all it takes. Whenever someone checks in to my BBS I look them up in the call book if they don't give their name and I add the name to their log entry. So my list has the call, first name and connect path. Please let me know if you want a copy. If you can handle IBM-PC diskettes I can send it on one of those if that would help. My very best of 73's and by the way the 'prize' TNC2 the IBM club got is now in service here in Boca as BCR. Take care ** Martin **

Any reader response to this: Would the SYSOPs support this callsign gathering activity? There may no longer be space to publish such a list, but it could travel around as a MailBox file.... ed.

- PRM -

** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
** FADCA is coordinating our digipeaters in Fla.**
** If you are planning to put up a digipeater, **
** contact FADCA at 812 Childers Loop, Brandon, **
** FL 33511 for registration forms. **
** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **

Hello, This is Glynn in Headland, Alabama. If I could get the full mod for the Gator switch I would like a copy. I don't get the Fadca Beacon but would like to. Is there any way to get one of the switches all ready modified and working? If so how much? I am running a BBS here in Headland, AL. but I dont have a good source of 820-1 boards....if u can help my address is RT. 2 Box 33 Headland, Alabama 36345. Name is Glynn Rogers <WB4RHO> and how can I receive the FADCA Beacon? tnx Glynn <wb4rho-2 BBS>

- - - - - - - - - - - - - - - - - - -

Dear Glynn,

Thanks for the message on my MailBox. I am really wondering how you got into Stuart from Headland, AL. I checked the route and it seemed that you came thru the STU digipeater and no other. The band conditions at 3:00 AM must have been super.

I have found the best source for 820-1 boards to be right from Xerox. They have a some sort of outlet in Dallas that sells parts, used boards, power supplies, keyboards and disk drives. The last guy that I know of got a reconditioned 820-1 for about $75. The supply varies and sometimes the used unchecked ones are missing chips but are much cheaper. Best bet for someone new to the 820-1 would be a reconditioned one. The power supply for the 820 is nothing special. It requires +5/+12/-12. The connector on the board is hard to find so if you can get a power supply from Xerox with the mating connector you will be better off. I have heard of these going for $25-$40. Xerox can be reached at 214-960-3367. Have your credit card ready when you call.

I can supply you with a set of EPROMS for the 820 which with a add on FAD Board and modem will make a GATOR 2 switch. There are a number of them running in Florida in place of the old wide area digipeaters. The GATOR 2 software is expiremental now and still under development by its author, Howard Goldstein, N2WX. It costs me about $10 to supply the two 27128 EPROMS and for the postage.

If you care to send me a #10 SASE with enough postage to cover a couple of ounces, I will be glad to send you a copy of the article that was in the August 1985 FADCA>BEACON and other later documentation on GATOR 2 and the hardware modifications that are required to the 820-1. I don't know of anyone who is selling the gear already modified and ready to operate as a switch.

The FADCA>BEACON which stated in Janurary 1984 as the newsletter of the Florida Amateur Digital Communications Assn is now part of the new Packet Radio Magazine. I think it is the best source of information about packet radio today. You can subscribe to PRM by sending $15 to: Packet Radio Magazine, 812 Childers Loop, Brandon, FL 33511.

73
Ted Huf, K4NTA

FADCA is a non-profit Florida corporation devoted to research, development, education, and public service.

Directors

Jack Brindle, WA4FIB
Jim Diggs, K4AHO
Ted Huf, K4NTA
Gwyn Reedy, W1BEL
Andy DeMartini, KC2FF
Howard Goldstein, N2WX
Dick Klein, W4PCM
Bill Whitaker, WD4JKM

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FADCA dues for 1986 are $15, of which $12 is for the subscription to PACKET RADIO MAGAZINE.

Reprints of back issues of the FADCA > BEACON are available for copying and mailing costs of $1.00 per issue, or $8.00 for an entire year (84 or 85). Both year's issues may be obtained for $15. Send your request to FADCA, 812 Childers Loop, Brandon, FL 33511.

MEETING ANNOUNCMENT

The Southern Region of the FADCA Network Coordinating Committee will meet Sunday, May 18th, at Noon, in the Glade Restaurant, US Highway 27, Clewiston, FL. Talk-in on 146.52.

The Naples, FL digipeater is not on as NAP [WA4HWN]. It has escellent connectivity to HST in Homestead.

Aug 9,10 Jacksonville, FL Hamfest.

* * * * * * * * *

FADCA is pleased to welcome the Mid-Atlantic Packet Radio Council to participation in PACKET RADIO MAGAZINE. MAPRC did not send an input this month.

* * * * * * * * *

W4NVC has a new digipeater in Pompano Beach. "PMB"

FADCA has Xerox 820 boards, FAD (dual port adaptor) boards, and Zilog 8530 SCC ICs. If you are interested in building up a Xerox 820 with the FAD, call FADCA at (813) 689-3355.

WANTED

The FADCA > BEACON badly needs an editor. The demands of pulling the entire magazine together prevent me from gathering and sifting the Florida news. Look at the UPRA or MARDA pages and see what difference a good editor makes. Will someone please step forward??? Only dedicated, hardworking souls need apply! Gwyn.

Grapes From The Grapevine

GRAPES officers for 1986:

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Dennis Barrow, WB4GQX
Eric Ellison, N4CI
Dick Stein, W4KAU

Club Officers
Pres- Paul Quillen, N4LCD
V Pres- Justin Myrick, N4LEL
Secy- David Chapman, KD4LM
Treas- Garey Barrell, K4OAH

Club Address:
GRAPES, Inc., PO Box 443, Duluth, GA 30316

Dues:
$20 per year payable Jan 1st. $10 after July 1st. Full time student and retired dues $15.

Meetings:
Fourth Saturday of each month at 10 AM at the Western Sizzlin' Restaurant in Doraville, GA (one mile north of I-285).

NOTICE

The SOUTHNET SSB Net meets each Sunday at 1400 EST/EDT on 7190 KHz +/- QRM. The NCS is Rip, W4FX. He reports that there are few check-ins, but those who do participate wish the net to continue. Rip wants to know:
1) Is Sunday at 1400 a good time? If not, when?
2) Is 7190 KHz a good frequency? If not, what is?
3) Who will volunteer to be alternate net control?
Drop a note to Rip: C. H. Merrell, W4FX, RT 13, Box 190, Anderson, SC 29624.

- PRM -

Note: Eric Ellison, N4CI, sent an excellent SOUTHNET article for April, but technical difficulties prevented its inclusion in this issue.

* * * * * * * * *

FADCA welcomes the Kansas City Area Packet Radio Group to participation in PACKET RADIO MAGAZINE.

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UPRA CONNECT continued from page 18.

PBBS: There are several PBBS stations now in operation. WA7UZO and KA7EGQ are running the WA7MBL BBS systems with IBM PCs. WA7YAZ is on the air with an Apple based system. All stations are currently on 145.01 MHz.

MEMBERSHIP: UPRA membership dues are $15 annually. Additional family members sharing a newsletter pay only $1.00.

NEWSLETTER MATERIAL: This may be sent to the address listed below, or via several electronic routes, which are either ASCII text files on IBM formatted disks or via a BBS. Contact me via the phone number below for more information. Submission deadline is slowly creeping earlier each month...call for more info.

ADDRESS: For all UPRA business:
Utah Packet Radio Association
4382 Cherryview Drive
West Valley City, Utah 84120
(801) 967-5896

- PRM -

UPRA CONNECT

Newsletter of the Utah Packet Radio Association

LINKED AT LAST

Dave Pedersen, N7BHC

At long last, a link has been established between Northern Utah and California. The final station was put into service in late March in Central Utah. The equipment was all donated to UPRA, and assembled by several UPRA members. The last link consists of a Heath HD-4040 (TAPR TNC-1 clone), a Yaesu FT-230R, a 4 element Cushcraft Yagi, and some control circuitry. Total assembly time once the equipment was procured was only six hours. Final planning to installation took less than a week. Here follows some information about the link, its development, problems and future.

Links with the outside world have been considered tantamount to the survival and growth of the Packet Radio community in Utah since the very beginning. The recently installed path links stations as far North as Preston, in Southeastern Idaho, to stations at the Mexican border. That translates to a straight-line distance of about 750 miles. This feat is made possible of the use "illegal towers", as Pete Eaton calls out super- ruggedized, tornado-proof, two-and-a-half mile high antenna towers (we just call them mountains).

Now this link, as it is now, is not all that reliable, as some of you have noticed that the last storm wiped out two of the stations near Cedar City in Central Utah. You can expect the link to be back in operation just as soon as we can find a means of getting up to the hilltops to work on the equipment. Now I will agree that is very difficult to blow one of towers down (very wide base, heavy duty construction, all that sort of stuff), but we do have a different problem...we still have more than five feet of packed snow on the mountaintops. We just have to wait until a Snowcat becomes available for the ride up. Summertime, of course,is no problem. Anyone wishing to donate a Snowcat or helicopter to us, please contact UPRA.

Another problem with the new link to California is that it stretches the AX.25 layer two protocol a little thin...eight digipeaters are frequently needed to talk between Nothern Utah and San Diego. This problem will be lessened when KD7YK-1 gets moved to a Mountaintop (it is now on the valley floor in Orem). Another helpful change will be one of the Cedar City machines being moved to a better location as well this spring. That will cut the required repeats by 2.

Throughput will still be extremely slow if a lot of stations are trying to use the link at the same time. Rather than a direct link between two stations operating in real-time, we need to adopt the "message-forwarding between Bulletin-boards" that is being used so successfully on the East Coast. This system would need two BBS stations to work well... one in Las Vegas, and another in Cedar City. This would mean that a message going between Salt Lake City and South Califonia would need a maximum of 2 digipeaters between end stations in most cases, rather than the 8 we currently need.

Where do we go next? Two sites have been approved for a link between Salt Lake and Boise, although only one is needed. Mount Harrison, the choice site, will be workable by the better equipped stations in Salt Lake, and will provide extensive coverage of Southern Idaho, reaching as far as West Yellowstone, Montana, and the hills above Boise, where a digipeater is already in operation. It will also work into Northwestern Nevada.

A second link is planned to California, this time across Nevada (Carlin and Reno). Furthermore, the link to the Front Range of Colorado (Denver) is become extremely desirable. This link will probably go through either the Vernal or Grand Junction areas, and then work its way toward Colorado Springs.

The next logical step will be higher speed, more efficient networking hardware. 9600 baud and faster links are planned. Of course, all plans for expansion and improvement of the system depends totally on the support of you, the user. Donations of equipment, time and knowledge are sorely needed. The Boise link, for example, needs only a radio for completion. If we all pool our resources, all these links can be a reality within six months.

And with no effort at all, they can amount to... nothing at all.

So please get involved...Packet Radio in our area will be a better thing for your effort.

THE LINK PATH AND CALLSIGNS

CALLSIGN	APPROX. LOCATION
K7EA-1 or WA7YAZ	Salt Lake City
KD7YK-1	Orem
WA7GTU-2	30 miles NW of Cedar City
N7HQK or WA7GTU	Cedar City
WA7GTU-1	Blowhard Peak (20 miles SE of Cedar City)
K7WS-1 or K7WS-2	Las Vegas
AA6TN-1	Big Bear
W6AMT-2 or W6AMT-3	-2 for So. Cal., -3 to head North.

The Cedar link will eventually go, as will the need for a digipeater to get from the average station in SLC to KD7YK-1.

UPRA DATA

MEETINGS: Held at the Heathkit Store, at 7200 South State (58E.), on the second Thursday evening of the month at 7.30 p.m. The next meeting will be on May 8.

VOICE NET: The information dissemination and question/answer net is held on Tuesday evenings at 8.45 p.m. , on the 146.02/62 repeater. Net control is Steve KI7L.

<< Continued on page 17

RMPRA › PACKET

A NEWSLETTER OF THE ROCKY MOUNTAIN PACKET RADIO ASSOCIATION

ROCKY MOUNTAIN REVOLUTION YEAR TWO

When asked to announce the formation of the Rocky Mountain Packet Radio Association at the 84 Division Convention, I had reservations. What could come of it?

Well, the progress, technical development, dedication, and direction taken make me proud to be a packeteer. For those of you who are not aware, West Slope progress is coming along at an exceedingly fast pace. Hopefully, by the first of June a digipeater will be coming into the metro area from San Toy Mountain at Kremmling; whereby, Vail, Eagle, Glenwood Springs, Steamboat Springs, Walden, Meeker, Rifle, Grand Junction, etc., should all be able to reach the Eastern Slope. Much work is going on and help will be appreciated.

As the SARES - State Amateur Emergency Servide Linking System - goes in, a digipeater will be placed at the same sites.

Keep up the great work. The entire amateur population is proud of your efforts. I have watched you grow from the beginning, and look for many more Hams to join the growing Packet Radio Revolution here in the Colorado Section.

73,
William "Bill" Sheffield, KQ0J
ARRL Colorado Section Manager

PACKET PRODUCT REVIEW

Bob Gobrick, WA6ERB

Amateur Packet Alaska TNC VHF/HF Switch

I just recently received direct from Amateur Packet Alaska (address AX.25 Communications Trail, Ester, Alaska, 99725) their new TNC VHF/HF Swithc Kit for the TAPR TNC-1, TNC-2 and clones.

What is unique about the switch is that it is not necessary to recalibrate the TNC every time you switch between the two tone sets. The only visible sign that indicates the unit is installed is the addition of a subminiature SPDT switch on the front panel. Operation in the TNC-1 involves flipping the switch and resetting your HBAUD parameter. The TNC-2 operation is just as easy - flip the switch and then reset the back panel DIP switches for the new HBAUD rate.

The kit ($30 postpaid) is very simple to build - a handful of resistors, capacitors, trimmer resistors, and one IC, all mounted on a small PC board. All this can be put together in an hour or two. An eleven page instruction guide is included and explains the mounting for the TNC-1, TNC-2 and true clones such as the Heath, AEA, Pac-Comm, GLB and MFJ - not Kantronics (just a quick aside: there is a misunderstanding that the new Kantronics KPC-2 is a TNC-2 CLone. It is not - the microprocessor is different, as is a number of other design parameters. When future TNC-2 EPROM upgrades are released they will only be aviailable for the true TNC-2 clones.)

All in all, a very nice contribution from the Alaska Packet gang!

RMPRA ANNUAL MEETING AND PACKETFEST

PACKETFEST '86' and the Rocky Mountain Packet Radio Association annual meeting will feature guest speaker, Pete Eaton, WB9FLW, Executive VP of TAPR.

Location is at Honeywell, Inc, in Littleton, 10 May at 9 AM.

The PACKETFEST will feature speakers and forums on :

Introduction to Packet
Packet Linking, Terrestrial and AMSAT
Bulletin Boards
Local area packet groups under the RMPRA umbrella
Front Range packet frequency allocation

Thanks, Packeteers
Chris Kelly, WD5IBS
President, RMPRA

This past year has been a lot of work for packeteers, and the RMPRA has grown to encompass a very large area. In response, we have organized in a way which we think will best serve all of you, and which suits the way volunteer organizations work. Your efforts in packet radio development and organization have helped build us to where we are today. I want to thank each of you for your support, and encourage you to continue your participation.

PBBS USER'S MANUAL AVAILABLE

Copies of the RMPRA Packet Bulletin Board System (PBBS) Users Manual are available for a double stamped business size envelope. Send your request to Bob Gobrick, WA6ERB, 14311 W. Virginia Drive, Lakewood, CO 80228. The manual is written by Dave, K0HOA, of Colorado Springs and Kit, KD0DI, of Durango.

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PRM is happy to welcome CAPRA to our publication.

The Chicago Area Packet Radio Association, CAPRA, was formed in 1983 by a group of ten experimental amateurs who recognized the promise of packet radio early in its development and organized themselves into a Tucson Amateur Packet Radio Association, TAPR, beta test group for the first versions of the TAPR terminal node controller. That original group has now grown to well over 100 full and associate members who have selected Gary Kaatz, W9TD, as President Don Lemke, WB9MJN, as Vice President Larry Burke, K9FLT, as Secretary and George Dorner, W9ZSJ, as Treasurer.

CAPRA holds their regular meeting at 2:00 PM on the second Saturday of each odd numbered month in the Glenside Public Library in Glendale Heights, IL. These meetings are usually concerned with packet radio operation, assistance to new "packeteers", arrangements for packet radio demonstrations, planning of seminars on packet radio at hamfests and the primary goal of CAPRA, participation in the national packet radio effort. This consists in the development a Network Node Controller and a 220 MHz backbone circuit that will make it possible for packet radio amateurs to link to the outside world using the most reliable ground based path possible.

The networking or linking project has received a significant advance with the development of a 9600 baud modem by Steve Goode, K9NG, a past vice president of CAPRA and now a TAPR director. Hardware and software development and testing efforts by CAPRA members are also continuing with regard to a 56K baud modem, 220 MHz radio transceiver design, antennas and network node controllers using an MC68000 based, single-board computer. The software is being provided by Phil Karn, an avid proponent of TCP/IP which Phil believes offers the best networking protocol. The software will require adaptation to the MC68000 based computers and this will be done by CAPRA members.

CAPRA is testing equipment for linking to major packet centers. This linking project involves the installation of a 220 MHz link between the CAPRA supported digipeater N9ATM-2 site in downtown Chicago and a location in the western suburbs. This test link will be used for testing the networking hardware and software. Additional 220 MHz radios will be purchased to allow CAPRA greater latitude in testing arrangements. This linking project is a prelude to the development of a networking system for reliable long distance communication.

In addition to these activities CAPRA supports a wide area coverage digipeater on 144.950 MHz, N9ATM-2, and endorses the mailboxes operated by Gerry Werner, WB9WBN, on 144.950 MHz and Don Lemke, WB9MJN, on 144.950/145.010 MHz. Contact with the CAPRA officers can be easily made through either mailbox. CAPRA also publishes The CAPRA Beacon, a bimonthly newsletter. Articles can be left for the editor at either of the above mailboxes. The deadline is the first of each even numbered month to have consideration for the next edition that comes out at the beginning of the odd numbered months. Only author identified articles are considered for publication.

For more information on becoming a full or associate CAPRA member send a SASE to CAPRA, P.O.Box 8251, Rolling Meadows,IL 60008.

- PRM -

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This is a paid advertisement

What's New at Pac-Comm?

Pac-Comm has arranged to manufacture and market the **dual port packet controller** designed by Terry Fox, WB4JFI, of AMRAD. The **PC-100** fits in a short slot of the IBM PC (TM) and compatibles. Each port is configurable with an onboard VLSI 300/1200 baud modem or RS-232 drivers to interface to an external line or modem. The completed version of the board will be available in July in several configurations. Pac-Comm will continue to support the experimenter and builder by providing bare boards and kits as well as ready to operate units.

PC-100 Development packages are available **NOW**for those persons interested in developing software for this board. Projects underway include a terminal node, a dual-port digipeater/gateway, and a BBS interface. Call Pac-Comm for additional details.

Another project in final development is the **PTU-200 HF modem and tuning indicator**. This unit will exactly match the TNC-200 cabinetry and will offer several convenience features not found on other designs. For instance, the front mounted switches will allow controlling the power (on/off) for both the PTU-200 and TNC-200 and selection of HF or VHF operation. The HF/VHF front panel switch controls all necessary functions, including changing the TNC-200 baud rate. Cables for both your HF and VHF rigs will plug into the PTU-200, so that no cable changing is required when switching between HF and VHF. Available in July at very competitive prices.

Back to the PC and clone users... Try Pac-Comm's new packet terminal software, **PC-PACKET**. This program gives you windows, colors, programmable function keys, macros, programmable help files and initialization files, and more. Let it monitor your TNC in background mode and build a disk file of what has been on the air while you use your PC for word processing or other tasks.

Pac-Comm is in touch with and supports the amateur packet community. We are working on other projects that will add to your operating plesure and support the development of an amateur network. More details next month.

Send for a free catalog or call for information.
See our ad inside the front cover.

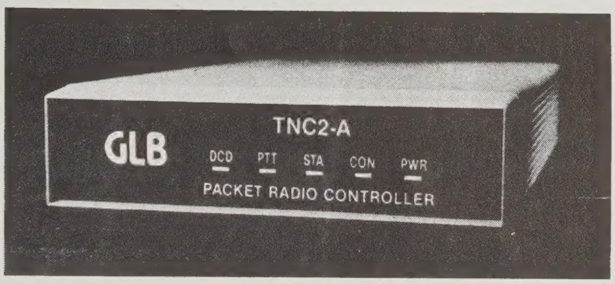
73,
Andy, KC2FF and Gwyn, W1BEL

* * *

GLB TNC2A PACKET CONTROLLER

GLB Electronics - the first commercial producer of packet controllers joins the "TAPR Revolution" to bring you the GLB Model TNC2A Kit. This kit is the latest TAPR design and is supplied with top quality components. The GLB TNC2A is backed by over 14 years of experience in amateur radio kit products and our technical staff is available to assist you daily from 1 to 3 PM Eastern time.

GLB Model TNC-2A Kit



FEATURES

- AX.25 Version 2.0 Software
- Terminal baud rates - 300,1200, 2400, 4800, 9600
- Multiple connects - up to 10 stations
- Date/time stamping
- Standard DB25 for RS232 connection
- Simple radio hookup
- Radio modem w/built-in counter for calibration
- Low power CMOS option
- Tuning indicator socket for HF & satellite work
- Modem disconnect for future options
- Lithium battery backup for RAM

Hardware
Software
Documentation
} by TAPR

SPECIFICATIONS

CPU	- Z80A microprocessor
Clock	- 2.4576 Mhz standard, 4.9152 Mhz available
Memory	- 32K EPROM, 16K RAM standard
HDLC	- Packets are controlled by hardware for maximum performance permitting full duplex operation
Modem	- 1200 baud, Bell 202 compatible (standard) easily configured for 300 baud/200 Hz shift for HF use
Serial	- Computer/Terminal port is industry standard RS-232-C compatible for use with most equipment
Radio	- Watchdog timer for channel protection transmits audio levels adjustable for nearly any radio. Wide dynamic range demodulator. Channel busy input (RF-DCD) to inhibit packet transmissions on a shared channel.
LEDs	- Power - tells you when power is applied Status - tells you when you have unacknowledged traffic in your buffers Connect - tells you when you are in the error-free mode DCD - tells you when your TNC2A senses other activity on the channel PTT - tells you when your TNC2A keys the transmitter
Power	- +10 to +15 VDC CMOS-110 ma NMOS-260 ma Typical

Model TNC2A Kit NMOS	$154.95
Model TNC2A Kit CMOS	$169.95

Quantity discount schedule:

1-2 pcs -	net
3-4 pcs -	7%
5-9 pcs -	10%
10-19 pcs -	15%
20 & up -	20%

Shipping weight - 5 lbs.

GLB ELECTRONICS, INC.

151 Commerce Pkwy.,
Buffalo, NY 14224
716-675-6740 9 to 4

TOO GOOD TO BE TRUE?

PAKRATT™ Model PK-64

shown with enhanced
HFM-64 option installed

★ MORSE ★ BAUDOT ★ ASCII ★ AMTOR ★ PACKET ★

FIRST FIVE MODE DATA CONTROLLER

The Pakratt model PK-64 by AEA is the world's first computer interface that offers Morse, Baudot, ASCII, AMTOR *and* Packet all in one box (hardware *and* software included) at a price many competitors charge for Packet alone (from $219.95 Amateur net). Do not let the low price fool you; coming from any other company but AEA it WOULD be too good to be true. The PK-64 works with virtually any voice transceiver. The Pakratt is the easiest of any to hook up and have operating in just a few minutes.

In Packet mode, the PK-64 offers virtually all the features of every other Packet controller on the market, plus many important features left out by others due to cost constraints. For example, we have included a hardware HDLC, true Data Carrier Detect (DCD), multiple connect with up to ten stations simultaneously and full implementation of version 2.0 of the AX.25 protocol.

Because the PK-64 was designed specifically for the Commodore 64 (or C-128 and SX-64) computer, we have been able to do many things not economically feasible with general RS-232 interface controllers. For example, the Pakratt includes true split screen operation with on-screen status indicators and an on-screen tuning indicator.

ENHANCED HFM-64 MODEM OPTION

The standard PK-64 will operate all modes with a phase-lock-loop (PLL) detector roughly equivalent to all popular packet modems in the marketplace (except we have included extra filtering). The enhanced HFM-64 modem option offers true independent dual channel filtering with A.M. detection (like the famous CP-100 Computer Patch™). The enhanced HFM-64 option also offers a hardware LED tuning indicator (like the CP-100) and a front panel variable threshold control for setting maximum sensitivity under various band ,conditions. We recommend the HFM-64 option for anyone keenly interested in weak-signal heavy-QRM HF operation. For anyone desiring to operate FM RTTY with the standard North American tone pair or CW receive, the HFM-64 is required. The HFM-64 is field installable with no soldering or test equipment required.

WORKS WITH THE POPULAR C-64 COMPUTER

AEA designed the PK-64 around the low-cost C-64 because of the special architecture features making it especially suited to Amateur Radio applications. The C-64 should not be viewed as a mainframe, but rather a very economical accessory to your data communications system. Many owners of expensive computers such as IBM, TANDY, APPLE, KAYPRO, ATARI, etc., are now buying the low cost C-64 and dedicating it to their operating position. They simply cannot find software for their machine that even approaches the power and user friendliness of the PK-64. Plus, think of the convenience of having only one controller and keyboard to go from one mode to another without having to redo cabling!

The PK-64 is so complete that all you need to do is wire up a microphone connector to the end of a cable (provided) and you are ready to go. There is no need to track down special terminal software, cabling or even a power supply. It all comes with the PK-64. So do not be the last on your block to own the most exciting new product in years. See the PK-64 at your favorite dealer or write for our specification sheet now

Prices And Specifications Subject To Change Without Notice Or Obligation

Advanced Electronic Applications, Inc.
P.O. Box C-2160, Lynnwood, WA 98036-0918
(206) 775-7373 Telex 6972496 AEA INTL UW

AEA Brings you the Breakthrough!